5Y3

MP MASTER

MA33630

Model 1603A

PROGRAMMABLE VIDEO GENERATOR

SERVICE MANUAL

****

<<WARNING>>

This service manual is for use by qualified personnel only. To avoid electrical shock, do not perform any service in this manual unless qualified to do so.

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edition Jun., 1989

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Abbreviations
CRTC: CRT Controller
HCLK: Horizontal Clock
DCLK: Display Clock
GCLK: Graphic Clock
GDC: Graphic Display Control
PCG: Programmable Character Generator

1 Program Specifications

(1) Clock frequency

a. Frequency range: 1.024 to 65.536MHz
b. Resolution: 1kHz step.

(2) Horizontal conditions

a. Total dots: 64 to 4096 dots
b. Frequency: 1.024 to 131.072kHz in 1Hz steps
c. Dots/character: 4 to 16 dots (note 1) in 1 dot steps
d. Displayed character: 2 to 255 characters in 1 character steps
e. Sync positioning: 1 to 4096 dots in 1 dot steps
f. Sync pulse width: 1 to 4095 dots in 1 dot steps

Note 1: The maximum dot clock frequency is subject to the following restrictions depending on the character size:

Horizontal character size (in dots)	Maximum dot clock frequency (in MHz)
4	55.000
5 to 16	60.000

(3) Vertical conditions

a. Total lines: 10 to 4096 lines in 1 line step
b. Frequency: 1.024 to 131.072Hz in 0.001Hz steps
c. Lines/character: 1 to 64 lines in 1 line step
d. Displayed lines: 2 to 4095 lines in 1 line step
e. Sync positioning: 1 to 4096 lines in 1 line step
f. Sync pulse width: 1 to 4095 lines in 1 line step

(4) Interlace selection

a. Non-interlace
b. Interlace
c. Interlace shrink (sync and video)

(5) Output setting

a. Sync signal polarity: Positive or negative, selectable
b. Composite sync signal: HS/HVS separate or composite output, selectable
c. Composite video signal: Whether composite sync signal is to be added to analog video signal or not is selectable.
d. Dot duty cycle: Horizontal display time of 50% (RZ signal) or 100% (NRZ signal), selectable.

(6) Character selection

a. Character font: 5 × 7 dots or 7 × 9 dots, selectable
b. Character set: Selectable among alphabetic (capital or small) characters, numeric, or Katakana characters according to JIS code used.
c. User-defined character font: Maximum 16 characters definable in 32 × 32 dots (in either ROM or RAM).

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3 Other Specifications

a. Power supply: 90 to 132V AC (180 to 264V AC optional), 50/60Hz

b. Power consumption: Approx. 150VA, 170VA, ± 10%

c. Dimensions: 426(W) × 150(H) × 450(D) mm

d. Weight: Approx. 9.2kg, 9.6 kg

e. Accessories:

TTL output 24P plug (57E-30240): 1
TTL output 14P plug (57E-30140): 1
Remote output 36P plug (57E-30360): 1
RS-232C 25P plug (DB-25P): 1
Universal junction shell (DB110963-3): 1
BNC-to-BNC cable (3C2V, 1.5m): 5
Power cord: 1
Spare fuse 1
Pattern label (white) (spare) 10
Instruction manual: 1

2. TEST EQUIPMENT REQUIRED

The following test equipment is required for calibration and servicing of the Model 1603A. The suggested specifications are minimum necessary for proper calibration of this instrument.

Test Equipment	Minimum Specifications
- Multimeter	Accuracy: ≤0.1% *LEADER Model LDM-852A
- Oscilloscope	Sensitivity: 10mV/div Bandwidth: 100MHz *LEADER Model LBO-516
- Frequency Counter	Frequency range: 150MHz *LEADER Model LDC-823A
- Picture Monitor	H: 15.75kHz V: 60Hz TTL/ANALOG Input
- Terminator	75 ohm, Feed-through *LEADER Model LT-1551

3. CALIBRATION PROCEDURE

3.1 General

Calibration should be preformed after a 30 minute warm-up period. It should also be confimed that the unit is connected to the rated power line voltage.

All adjustments should be completed in the given order, because some adjustments interact with others.

During the adjustment procedure, remove the case only when necessary and replace immediately after making an adjustment. This will maintain all circuit at constant operating temperature.

WARNING
Electrical shock hazards exist inside this instrument when covers are removed.

3.2 Power Supply

- Connect the DC voltmeter between test point (T-3588, power dist. board) and chassis.

- Adjust switching regulator as necessary, according to Table 3-1.

Voltage	Tolerance	Adjustment
+5V	-	+5V ADJ
-5V	-4.75V to -5.25V	-
+15V	+14.25V to +15.75V	-
-15V	-14.25V to -15.75V	-

Table 3-1

3.3 Clock Synthesizer

NOTE Synthesizer board, T-3436 is located inside a shielded package. If it is necessary to open this package, take care to close unit every time an adjustment is needed allow temperature to stabilize once again.

(1) Reference Voltage
- Connect the DC volmeter to TP30 (T-3436, synthesizer board).

a. High Frequency
- Set the Dot Clock Frequency to 46.250MHz.

- The voltage reading at TP30, should be +2.1V within +/-0.5V (+1.6V to +2.6V). If not, adjust L31, HIGH (T-3436, synthesizer board) for a voltage reading of +2.1V.

- Set the Dot Clock Frequency to 65.535MHz.

- The voltage reading should be between +9V and +10V.

b. Low Frequency
- Set the Dot Clock Frequency to 32.768.

- The voltage reading at TP30 should be +2.0V within +/-0.5V (+1.5V to +2.5V). If not, adjust L32, LOW (T-3436, synthesizer board) for a voltage reading of +2.0V.

- Set the Dot Clock Frequency to 46.249.

- The voltage reading should be between +8.8V and +9.8V.

(2) Frequency Adjustment
- Set the Dot Clock Frequency to 50,000MHz.

- Connect the frequency counter to TTL output connector (T-3436, synthesizer board).

- Adjust VC30, 100MHz ADJ (T-3436, synthesizer board) for a frequency reading of 50,000MHz.

3.4 Video Interface
(1) Offset
- Set the controls to obtain a Crosshatch pattern.

- Connect the oscilloscope to R OUTPUT connector, on the rear panel, via 75 ohm terminator.

- Adjust VR64,m R OFFSET (T-3445, video I/F board) for a pedestal level of 0Vdc.

Apply the same procedure for B and G by using following adjustments.

VR34: G OFFSET (T-3445, video I/F board)
VR4: B OFFSET (T-3445, video I/F board)

4. TROUBLESHOOTING PROCEDURE

4.1 General

Confirm that equipment used with the Model 1603A is operating correctly.

Check all control settings on the front and rear panels. Incorrect setting can make a good unit appear defective. If there is any question about the function, refer to the Instruction manual for a correct operation.

Check all circuits for visual defects such as broken components, loose connections, open wires, poor soldering, etc.

Some troubles can be solved with proper adjustment.

Check the voltage and waveform as shown in the Schematic Diagram to locate the defective circuit. Start with the power supply.

*** WARNING ***
Electrical shock hazards exist inside this instrument when covers are removed.

4.2 Theory of Operation

The Model 1603A is divided into five major sections; CPU, CRT controller, Graphics(option), Synthesizer and Video interface sections. Refer to the block diagram Figure 4-1.

Two CPUs, master and slave provide control to the instrument. The master CPU monitors the front panel controls waiting operator commands. The slave CPU applies these command signal to the CRT controller, graphics, synthesizer and video interface when the master CPU confirms the entered data is correct. A slave CPU RAM contains a character data.

The CRT controller counts a clock signal in conjunction with the video interface to produce vertical and horizontal sync signals. The controller receives the character data from the slave CPU and counts the order of the attribute signal and writes these into RAM.

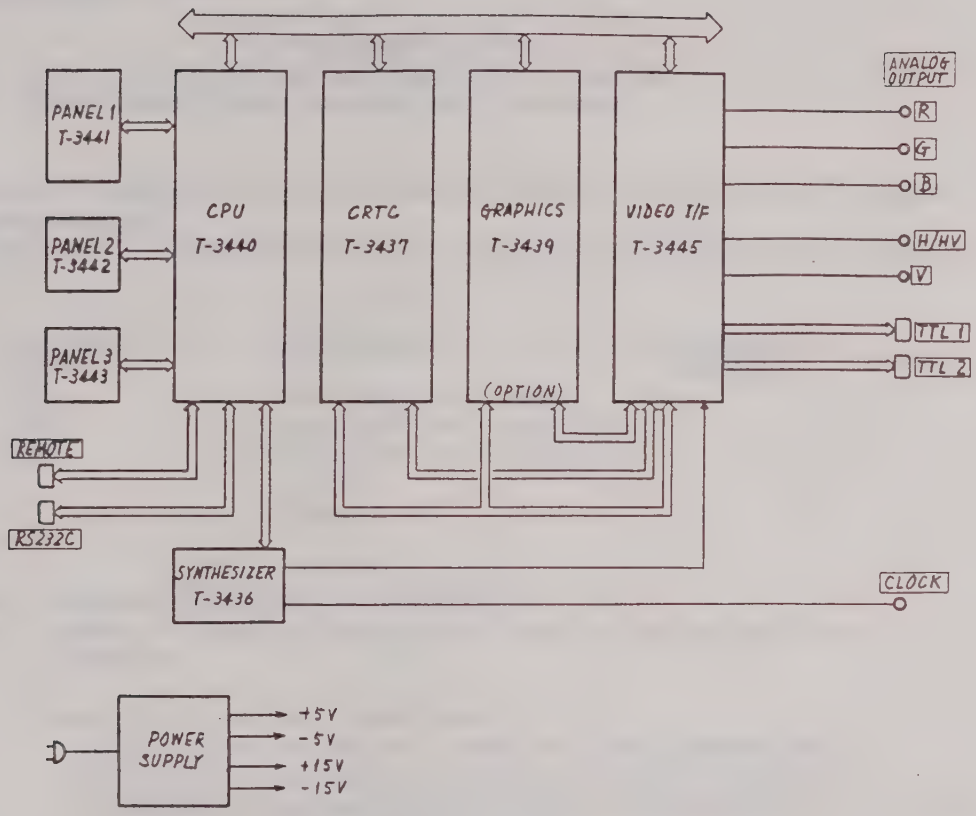


Figure 4-1

The Graphics section calculates the X-Y coordinates of the pattern signal with the command of the slave CPU and writes this into RAM on the graphic board.

The Graphics, controlled by the slave CPU, produces a clock signal of minimum character cell size.

The Video interface generates a video signal by processing the data and clock signals from the CRT controller and graphics RAM.

*** WARNING ***
Electrical shock hazards exist inside this instrument when covers are removed.

(1) Overall operation is not satisfactory or no signal output.
a. Power supply
Check power supplies within tolerance according to Table 4-1.

Voltage	Tolerance	Adjustment
+5V	-	+5V ADJ
-5V	-4.75V to 5.25V	-
+15V	+14.25V to +15.75V	-
-15V	+14.25V to -15.75V	-

Table 4-1

Yes: Proceed to step "(2)", CPU.
No: Check following points to locate the defective circuit.

Line fuse on the rear panel
1A time-lag fuse for 100V to 120V operation.
0.5A time-lag fuse for 200V to 240V operation.
CAUTION Use specified Fuse when replace it. Refer to "8. Parts List".

Switching regulator

(2) CPU Check
a. Turn power on.
The instrument should sounds as follows;
Long beep.....Short beep
Yes: CPU works properly. Proceed to step "(3)", self test.
No: Turn power off.
Remove connector, P270(T-3440, CPU board).
Turn power on.
Instrument sounds.
yes- CPU works properly. Connect the P270.
Proceed to step "(4) a".
no- Troubleshoot CPU and associated circuit.

(3) Self-Test

Function "F" carries out self diagnostics on the 1603A hard ware. See the Instruction manual for a reference. Table 4-2 shown the contents.

CAUTION

Test 07 destroys the data in the RAM.

Before entering the self-test mode, remove the picture monitor.
After the tests are completed, be sure to power off the instrument once.

Test no.	Test
00	LED test
01	Buzzer test
02	Key test
03	RS-232C loopback test
04	Remote loopback test
05	Master/slave CPU communication test
06	Slave CPU RAM test
07	Master CPU RAM test

Table 4-2

Operation: FUNCTION-F-INC(Display: F.F SELF. XX)

00: LED test(Display: F.F SELF. 00)
All LEDs light.
Yes: Proceed to next step. Press CLEAR key.
No: Troubleshoot IC120(T-3440, CPU board) and associated circuit.

01: Buzzer test(Display: F.F SELF. 01)
The instrument sounds three short beeps and one long beep repeated three times.
Yes: Proceed to next step. Press CLEAR key.
No: Troubleshoot Buzzer, SP1(T-3440, CPU board) and associated circuit.

02: Key test(Display: F.F SELF. 02)
NOTE The instrument displays the key code of each key on the two rightmost digits of the DATA display. Refer to Table 4-3.
The gray scale associated with the luminance switch is displayed in hexadecimal in the next leftmost digit of the DATA display.

The split ratio is associated with the Split Ratio switch in the leftmost digit, with the horizontal segments of the 7-segment LED representing 1/3(upper), 2/2(intermediate), and 3/1(lower), respectively.

The instrument displays the key code of each key on the two rightmost digits of the DATA display. Refer to Table 4-3.

Yes: Proceed to next step. Press CLEAR key.

No: Troubleshoot IC120(T-3440, CPU board) and associated circuit.

KEY	CODE	KEY	CODE	KEY	CODE
INC	11	TOTAL LINES	2C	ENABLE R	40
WRITE	12	FREQUENCY	2D	ENABLE G	41
SET	13	LINES/CHAR.	2E	ENABLE B	42
0	00	DISP./CHAR.	2F	ENABLE I	43
1	01	SYNC POS.	30	INV	44
2	02	SYNC PULSE W	31	ADD SYNC R	45
3	03	DOT CLOCK	32	ADD SYNC G	46
4	04	SCANNING	33	ADD SYNC B	47
5	05	CHAR.FONT	34	DOT DUTY	48
6	06	CHAR.CODE	35	H/HV SEL	49
7	07	USER.CHAR	36	POL.H/HV	4A
8	08	FUNCTION	37	V	4B
9	09	PATTERN 0	F0		
A	0A	1	F1		
B	0B	2	F2		
C	0C	3	F3		
D	0D	4	F4		
E	0E	5	F5		
F	0F	6	F6		
ADDRESS	20	7	F7		
ROM/RAM	21	8	F8		
REMOTE	23	9	F9		
SAVE	24	A	FA		
LOAD	25	B	FB		
TOTAL DOTS	26	C	FC		
FREQUENCY	27	D	FD		
DOTS/CHAR.	28	E	FE		
DIPS./CHAR.	29	F	FF		
SYNC POS.	2A				
SYNC PULSE W	2B				

Table 4-3

03: RS-232C loopback test(Display: F.F SELF. 03)
NOTE A loopback test, needs RS-232C connector wired as follows:
Connect pin 2 and 3, 4 and 5, 6 and 20.

The instrument displays send/receive data from FFH through 00H on the DATA display.
The DATA display indicates;
PASS: Proceed to next step. Press CLEAR key.
Err.11: Troubleshoot IC61(T-3440, CPU board) and associated circuit.

04: Remote loopback test(Display: F.F SELF. 04)
NOTE A loopback test, needs REMOTE connector shorting the facing pins(pin 1 and 19, 2 and 20, etc).

The DATA display indicates;
PASS: Proceed to next step. Press CLEAR key.
Err.10: Troubleshoot IC101, IC102(T-3440, CPU board) and associated circuit.

* Any error occuring in the one of master/slave communication test, slave CPU RAM test, and master CPU RAM test that follow are indications of fatal faults of the instrument.
After executing one of these tests, be sure to temporarily switch off of the instrument.

05: Master/slave communication test.
The DATA display indicates;
PASS: Proceed to next step. Press CLEAR key.
None: Troubleshoot IC160, IC161(T-3440, CPU board) and associated circuit.

06: Slave CPU RAM test
The DATA display indicates that the instrument is testing as follows.
tESt. 1: Work RAM test
tESt. 2: Timing RAM test
tESt. 3: V-RAM test
tESt. 4: PCG RAM test
tESt. 5: Graphic RAM test(option)

Approximately 20 seconds are required to carry out test 1 through 5.

The DATA display indicates PASS after tESt. 5 is completed.
PASS: Proceed to next step. Press CLEAR key.

tESt.1
Err.03: Troubleshoot IC247(T-3440, CPU board) and associated circuit.

tESt.2
Err.04: Troubleshoot IC180-IC183, IC200-IC205, IC210-IC215(T-3445, video I/F board) and associated circuit.

tESt.3
Err.05: Troubleshoot IC200-IC227, IC230-IC237(T-3437, CRTC board) and associated circuit.

tESt.4
Err.06: Troubleshoot IC260-IC267, IC270-IC277(T-3437, CRTC board) and associated circuit.

tESt.5
Err.07: Troubleshoot IC200-IC207, IC210-IC217, IC220-IC227, IC230-IC237(T-3439, graphics board) and associated circuit.

07: Master CPU RAM test

CAUTION
The contents of the RAM are destroyed by this test.

The DATA display indicates;
PASS: The instrument works properly. Press CLEAR key.
Err.07: Troubleshoot IC45, 46(T-3440, CPU board) and associated circuit.

(4) Output

a. No analog signal comes out.
Troubleshoot analog circuit(T-3445, video I/F board) and its power supply.

b. No analog and digital signal comes out.
Troubleshoot clock generator and associated circuit.

c. H frequency is difference from the displayed frequency.
Check IC200-IC205, IC210-IC215(T-3445, video I/F board) and associated circuit.

d. V frequency is different from the display.
Check IC180-IC183(T-3445, video I/F board) and associated circuit.

e. No crosshatch, window pattern appears.
Troubleshoot crosshatch generator(T-3445, video I/F board) and associated circuit.

f. No character pattern appears.
Troubleshoot character generator(T-3445, video I/F board) and associated circuit.

g. No circle pattern appears.
Troubleshoot graphic generator(T-3445, video I/F board) and associated circuit.

h. No gray scale and color bar pattern appears.
Troubleshoot attribute(T-3445, video I/F board) and associated circuit.

i. No video component on the composite video signal.
Troubleshoot blanking circuit(T-3445, video I/F board) and associated circuit.

j. OUTPUT keys do not work
Troubleshoot suitable circuit correspond to each key (T-3445, video I/F board) and associated circuit.

k. Check that the clock signal system for proper distribution.
J220(T-3445, video I/F board)

(5) Error Message

Error message	Probable cause
CrASH	Backup RAM data destroyed
ProtEc.	Writing into protected RAM
rn9.Err	Erroneous program data
Ptn.Err	No pattern number registered
PAr.Err	Erroneous pattern parameter
Con.Err	REMOTE connector wiring incorrect
Usr.Err	User ROM not installed
PAtn.**	Pattern number error
X. ****	Pattern parameter error
rd.Err	Error occurs in user ROM copy mode
t.Error	Time out error(RS-232C malfunction)
F.Error	Frame error(RS-232C malfunction)
o.Error	Over run error(RS-232C malfunction)
P.Error	Parity error(RS-232C malfunction)
d.Error	Data error(RS-232C malfunction)
c.Error	Check sum error(RS-232C malfunction)
Err.01	Slave CPU not response
Err.02	Back up RAM malfunction
Err.03	Work RAM malfunction
Err.04	Timing RAM malfunction
Err.05	V-RAM malfunction
Err.06	PCG-RAM malfunction
Err.07	Graphics-RAM malfunction
Err.08	Problem on bank selection
Err.09	Master/slave communication data error
Err.10	REMOTE loopback error
Err.11	RS-232C loopback error

*: Display flickers

No.	LDR PT No.	DESCRIPTION		
(T-3436 CONT'D)				
D38	3110006004	DETECTOR	IS1588	
D31A	3140019004	VARICAP	ISV68	
D31B	3140019004	VARICAP	ISV68	
D32A	3140019004	VARICAP	ISV68	
D32B	3140019004	VARICAP	ISV68	
-INTEGRATED CIRCUITS-				
IC1	3260132992	TTL	74LS132	
IC2	3260138994	TTL	74LS138	
IC3	3260374996	TTL	74LS374	
IC4	3260374996	TTL	74LS374	
IC5	3370124118	ECL	MC10124L	
IC6	3217812991	REGULATOR	7812P	+12V 1A
IC7	3217805994	REGULATOR	7805P	+5V 1A
IC8	3217912995	REGULATOR	7912P	-12V 1A
IC30	3380116116	ECL	MC10H116L	
IC31	3370231018	ECL	HD10231	
IC32	3370231018	ECL	HD10231	
IC33	3370231018	ECL	HD10231	
IC34	3370164110	ECL	MC10164L	
IC35	3380116116	ECL	MC10H116L	
IC36	3370125110	ECL	MC10125L	
IC37	3290020002	TTL	74F20 PC	
IC38	3330106008	PLL	CX-7925B	
IC39	3220075008	OP AMP	LF411	
-COILS-				
L30	3970471016	CHOKE COIL	470uH	
L31	3900710000	COIL	L-710	
L32	3900710000	COIL	L-710	
L33	3970471016	CHOKE COIL	470uH	
-PC BOARD-				
	5903436039		T-3436C	
-MISCELLANEOUS-				
X30	3510013003	CRYSTAL	NC-18C	4.000MHz

*** CRTC T-3437 ***

-RESISTORS-					
R110	1000101005	CARBON FILM	100 OHM	5%	1/6W
R111	1000472000	CARBON FILM	4.7K OHM	5%	1/6W
R120	1000102007	CARBON FILM	1K OHM	5%	1/6W
R121	1000102007	CARBON FILM	1K OHM	5%	1/6W
R122	1000102007	CARBON FILM	1K OHM	5%	1/6W
R123	1000102007	CARBON FILM	1K OHM	5%	1/6W
R124	1000102007	CARBON FILM	1K OHM	5%	1/6W
R125	1000102007	CARBON FILM	1K OHM	5%	1/6W
R130	1000102007	CARBON FILM	1K OHM	5%	1/6W
R131	1000102007	CARBON FILM	1K OHM	5%	1/6W
R132	1000102007	CARBON FILM	1K OHM	5%	1/6W
R140	1000102007	CARBON FILM	1K OHM	5%	1/6W
R141	1000102007	CARBON FILM	1K OHM	5%	1/6W
R142	1000102007	CARBON FILM	1K OHM	5%	1/6W

No.	LDR PT No.	DESCRIPTION			
(T-3437	CONT'D)				
R170	1000102007	CARBON FILM	1K OHM	5%	1/6W
R180	1000102007	CARBON FILM	1K OHM	5%	1/6W
R181	1000102007	CARBON FILM	1K OHM	5%	1/6W
R182	1000102007	CARBON FILM	1K OHM	5%	1/6W
R190	1000101005	CARBON FILM	100 OHM	5%	1/6W
R210	1000102007	CARBON FILM	1K OHM	5%	1/6W
R250	1000102007	CARBON FILM	1K OHM	5%	1/6W
RA100	1515103116	RESISTOR ARRAY	10K OHMX8	5%	1/8W
-CAPACITORS-					
C100	2090016006	CERAMIC	0.1uF		50V
C101	2090016006	CERAMIC	0.1uF		50V
C102	2090016006	CERAMIC	0.1uF		50V
C103	2090016006	CERAMIC	0.1uF		50V
C104	2090016006	CERAMIC	0.1uF		50V
C105	2220331047	ELECTROLYTIC	330uF	20%	10V
C110	2090016006	CERAMIC	0.1uF		50V
C111	2090016006	CERAMIC	0.1uF		50V
C112	2090016006	CERAMIC	0.1uF		50V
C113	2090016006	CERAMIC	0.1uF		50V
C114	2090016006	CERAMIC	0.1uF		50V
C115	2090016006	CERAMIC	0.1uF		50V
C116	2090016006	CERAMIC	0.1uF		50V
C117	2090016006	CERAMIC	0.1uF		50V
C120	2090016006	CERAMIC	0.1uF		50V
C121	2090016006	CERAMIC	0.1uF		50V
C122	2090016006	CERAMIC	0.1uF		50V
C123	2090016006	CERAMIC	0.1uF		50V
C124	2090016006	CERAMIC	0.1uF		50V
C130	2090016006	CERAMIC	0.1uF		50V
C131	2090016006	CERAMIC	0.1uF		50V
C132	2090016006	CERAMIC	0.1uF		50V
C133	2090016006	CERAMIC	0.1uF		50V
C134	2090016006	CERAMIC	0.1uF		50V
C135	2090016006	CERAMIC	0.1uF		50V
C136	2090016006	CERAMIC	0.1uF		50V
C137	2090016006	CERAMIC	0.1uF		50V
C138	2090016006	CERAMIC	0.1uF		50V
C140	2090016006	CERAMIC	0.1uF		50V
C141	2090016006	CERAMIC	0.1uF		50V
C142	2090016006	CERAMIC	0.1uF		50V
C143	2090016006	CERAMIC	0.1uF		50V
C150	2090016006	CERAMIC	0.1uF		50V
C151	2090016006	CERAMIC	0.1uF		50V
C152	2090016006	CERAMIC	0.1uF		50V
C153	2090016006	CERAMIC	0.1uF		50V
C154	2090016006	CERAMIC	0.1uF		50V
C155	2090016006	CERAMIC	0.1uF		50V
C156	2090016006	CERAMIC	0.1uF		50V
C157	2090016006	CERAMIC	0.1uF		50V
C158	2090016006	CERAMIC	0.1uF		50V
C160	2090016006	CERAMIC	0.1uF		50V
C161	2090016006	CERAMIC	0.1uF		50V
C162	2090016006	CERAMIC	0.1uF		50V
C163	2090016006	CERAMIC	0.1uF		50V
C164	2090016006	CERAMIC	0.1uF		50V
C165	2090016006	CERAMIC	0.1uF		50V

No.	LDR PT No.	DESCRIPTION		
(T-3437	CONT'D)			
C166	2090016006	CERAMIC	0.1uF	50V
C167	2090016006	CERAMIC	0.1uF	50V
C168	2090016006	CERAMIC	0.1uF	50V
C170	2090016006	CERAMIC	0.1uF	50V
C171	2090016006	CERAMIC	0.1uF	50V
C172	2090016006	CERAMIC	0.1uF	50V
C173	2090016006	CERAMIC	0.1uF	50V
C174	2090016006	CERAMIC	0.1uF	50V
C175	2090016006	CERAMIC	0.1uF	50V
C176	2090016006	CERAMIC	0.1uF	50V
C180	2090016006	CERAMIC	0.1uF	50V
C181	2090016006	CERAMIC	0.1uF	50V
C182	2090016006	CERAMIC	0.1uF	50V
C183	2090016006	CERAMIC	0.1uF	50V
C184	2090016006	CERAMIC	0.1uF	50V
C185	2090016006	CERAMIC	0.1uF	50V
C186	2090016006	CERAMIC	0.1uF	50V
C187	2090016006	CERAMIC	0.1uF	50V
C188	2090016006	CERAMIC	0.1uF	50V
C189	2090016006	CERAMIC	0.1uF	50V
C190	2090016006	CERAMIC	0.1uF	50V
C191	2090016006	CERAMIC	0.1uF	50V
C192	2090016006	CERAMIC	0.1uF	50V
C193	2090016006	CERAMIC	0.1uF	50V
C194	2090016006	CERAMIC	0.1uF	50V
C195	2090016006	CERAMIC	0.1uF	50V
C196	2090016006	CERAMIC	0.1uF	50V
C197	2090016006	CERAMIC	0.1uF	50V
C198	2090016006	CERAMIC	0.1uF	50V
C199	2090016006	CERAMIC	0.1uF	50V
C200	2090016006	CERAMIC	0.1uF	50V
C210	2090016006	CERAMIC	0.1uF	50V
C211	2090016006	CERAMIC	0.1uF	50V
C212	2090016006	CERAMIC	0.1uF	50V
C213	2090016006	CERAMIC	0.1uF	50V
C214	2090016006	CERAMIC	0.1uF	50V
C220	2090016006	CERAMIC	0.1uF	50V
C221	2090016006	CERAMIC	0.1uF	50V
C222	2090016006	CERAMIC	0.1uF	50V
C223	2090016006	CERAMIC	0.1uF	50V
C224	2090016006	CERAMIC	0.1uF	50V
C225	2090016006	CERAMIC	0.1uF	50V
C226	2090016006	CERAMIC	0.1uF	50V
C227	2090016006	CERAMIC	0.1uF	50V
C230	2090016006	CERAMIC	0.1uF	50V
C231	2090016006	CERAMIC	0.1uF	50V
C232	2090016006	CERAMIC	0.1uF	50V
C233	2090016006	CERAMIC	0.1uF	50V
C234	2090016006	CERAMIC	0.1uF	50V
C235	2090016006	CERAMIC	0.1uF	50V
C236	2090016006	CERAMIC	0.1uF	50V
C237	2090016006	CERAMIC	0.1uF	50V
C240	2090016006	CERAMIC	0.1uF	50V
C241	2090016006	CERAMIC	0.1uF	50V
C242	2090016006	CERAMIC	0.1uF	50V
C243	2090016006	CERAMIC	0.1uF	50V
C244	2090016006	CERAMIC	0.1uF	50V

No.	LDR PT No.	DESCRIPTION		
(T-3437	CONT'D)			
C245	2090016006	CERAMIC	0.1uF	50V
C250	2090016006	CERAMIC	0.1uF	50V
C251	2090016006	CERAMIC	0.1uF	50V
C252	2090016006	CERAMIC	0.1uF	50V
C253	2090016006	CERAMIC	0.1uF	50V
C254	2090016006	CERAMIC	0.1uF	50V
C255	2090016006	CERAMIC	0.1uF	50V
C256	2090016006	CERAMIC	0.1uF	50V
C260	2090016006	CERAMIC	0.1uF	50V
C261	2090016006	CERAMIC	0.1uF	50V
C262	2090016006	CERAMIC	0.1uF	50V
C263	2090016006	CERAMIC	0.1uF	50V
C264	2090016006	CERAMIC	0.1uF	50V
C265	2090016006	CERAMIC	0.1uF	50V
C266	2090016006	CERAMIC	0.1uF	50V
C267	2090016006	CERAMIC	0.1uF	50V
C270	2090016006	CERAMIC	0.1uF	50V
C271	2090016006	CERAMIC	0.1uF	50V
C272	2090016006	CERAMIC	0.1uF	50V
C273	2090016006	CERAMIC	0.1uF	50V
C274	2090016006	CERAMIC	0.1uF	50V
C275	2090016006	CERAMIC	0.1uF	50V
C276	2090016006	CERAMIC	0.1uF	50V
C277	2090016006	CERAMIC	0.1uF	50V
C280	2090016006	CERAMIC	0.1uF	50V
C281	2090016006	CERAMIC	0.1uF	50V
C282	2090016006	CERAMIC	0.1uF	50V
C283	2090016006	CERAMIC	0.1uF	50V
C284	2090016006	CERAMIC	0.1uF	50V
C285	2090016006	CERAMIC	0.1uF	50V
C290	2090016006	CERAMIC	0.1uF	50V
C291	2090016006	CERAMIC	0.1uF	50V
C292	2090016006	CERAMIC	0.1uF	50V
C293	2090016006	CERAMIC	0.1uF	50V
-DIODE-				
D100	3110019003	RECTIFIER	1DZ61	
-INTEGRATED CIRCUITS-				
IC100	3260541009	TTL	SN74LS541	
IC101	3260541009	TTL	SN74LS541	
IC102	3260645010	TTL	SN74LS645N	
IC103	3260541009	TTL	SN74LS541	
IC104	3260008001	TTL	HD74LS08P	
IC110	3260138004	TTL	HD74LS138P	
IC111	3260138004	TTL	HD74LS138P	
IC112	3260138004	TTL	HD74LS138P	
IC113	3260132002	TTL	HD74LS132P	
IC114	3260032008	TTL	HD74LS32P	
IC115	3260374006	TTL	SN74LS374N	
IC116	3260032008	TTL	HD74LS32P	
IC117	3260009003	TTL	HD74LS09P	
IC120	3270140008	TTL	SN74S140	
IC121	3290163004	TTL	74F163 PC	
IC122	3290163004	TTL	74F163 PC	
IC123	3290161000	TTL	74F161 PC	
IC124	3290161000	TTL	74F161 PC	

No.	LDR PT No.	DESCRIPTION	
(T-3437	CONT'D)		
IC130	3260682007	TTL	SN74LS682N
IC131	3260682007	TTL	SN74LS682N
IC132	3260682007	TTL	SN74LS682N
IC133	3260374006	TTL	SN74LS374N
IC134	3260374006	TTL	SN74LS374N
IC135	3290175001	TTL	74F175 PC
IC136	3290074005	TTL	74F74 PC
IC137	3290175001	TTL	74F175 PC
IC138	3290004004	TTL	74F04 PC
IC140	3270140008	TTL	SN74S140
IC141	3290161000	TTL	74F161 PC
IC142	3290161000	TTL	74F161 PC
IC143	3290161000	TTL	74F161 PC
IC150	3260682007	TTL	SN74LS682N
IC151	3260085009	TTL	HD74LS85P
IC152	3260682007	TTL	SN74LS682N
IC153	3260085009	TTL	HD74LS85P
IC154	3260000005	TTL	HD74LS00P
IC155	3260374006	TTL	SN74LS374N
IC156	3260174008	TTL	HD74LS174P
IC157	3260374006	TTL	SN74LS374N
IC158	3260174008	TTL	HD74LS174P
IC160	3260682007	TTL	SN74LS682N
IC161	3260085009	TTL	HD74LS85P
IC162	3260682007	TTL	SN74LS682N
IC163	3260085009	TTL	HD74LS85P
IC164	3260000005	TTL	HD74LS00P
IC165	3260374006	TTL	SN74LS374N
IC166	3260174008	TTL	HD74LS174P
IC167	3260374006	TTL	SN74LS374N
IC168	3260174008	TTL	HD74LS174P
IC170	3260174008	TTL	HD74LS174P
IC171	3290000006	TTL	74F00 PC
IC172	3290074005	TTL	74F74 PC
IC173	3260074004	TTL	HD74LS74P
IC174	3260074004	TTL	HD74LS74P
IC175	3260074004	TTL	HD74LS74P
IC176	3260000005	TTL	HD74LS00P
IC180	3290161000	TTL	74F161 PC
IC181	3290161000	TTL	74F161 PC
IC182	3290157009	TTL	74F157 PC
IC183	3290157009	TTL	74F157 PC
IC184	3260682007	TTL	SN74LS682N
IC185	3290008002	TTL	74F08 PC
IC186	3290032009	TTL	74F32 PC
IC187	3290074005	TTL	74F74 PC
IC188	3290000006	TTL	74F00 PC
IC189	3260374006	TTL	SN74LS374N
IC190	3290008002	TTL	74F08 PC
IC191	3290032009	TTL	74F32 PC
IC192	3260132002	TTL	HD74LS132P
IC193	3290161000	TTL	74F161 PC
IC194	3290161000	TTL	74F161 PC
IC195	3290161000	TTL	74F161 PC
IC196	3290161000	TTL	74F161 PC
IC197	3260273000	TTL	SN74LS273N
IC198	3260273000	TTL	SN74LS273N

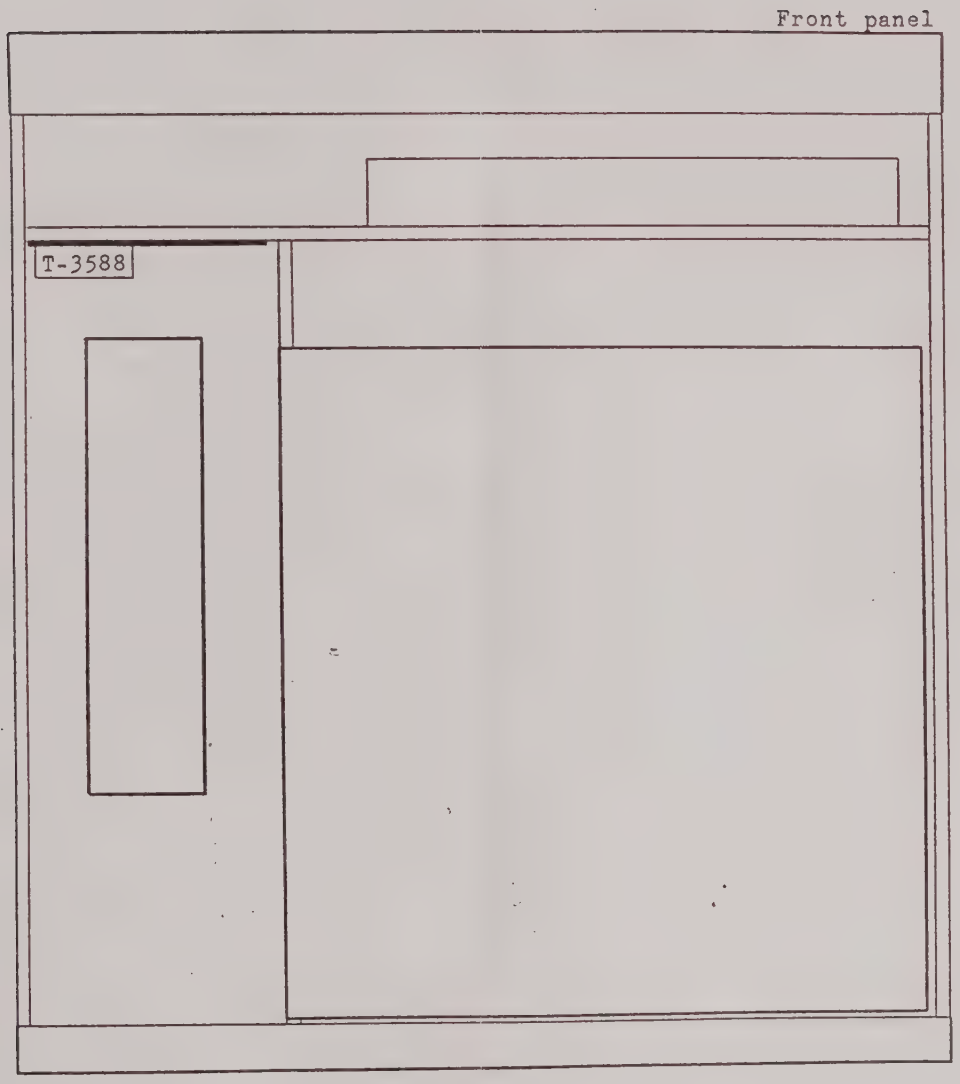
No.	LDR PT No.	DESCRIPTION	
(T-3437	CONT'D)		
IC199	3260374006	TTL	SN74LS374N
IC200	3260374006	TTL	SN74LS374N
IC210	3290157009	TTL	74F157 PC
IC211	3290157009	TTL	74F157 PC
IC212	3290157009	TTL	74F157 PC
IC213	3290157009	TTL	74F157 PC
IC214	3260139006	TTL	HD74LS139P
IC220	3330104994	CMOS-RAM	16kX1 35n
IC221	3330104994	CMOS-RAM	16kX1 35n
IC222	3330104994	CMOS-RAM	16kX1 35n
IC223	3330104994	CMOS-RAM	16kX1 35n
IC224	3330104994	CMOS-RAM	16kX1 35n
IC225	3330104994	CMOS-RAM	16kX1 35n
IC226	3330104994	CMOS-RAM	16kX1 35n
IC227	3330104994	CMOS-RAM	16kX1 35n
IC230	3330104994	CMOS-RAM	16kX1 35n
IC231	3330104994	CMOS-RAM	16kX1 35n
IC232	3330104994	CMOS-RAM	16kX1 35n
IC233	3330104994	CMOS-RAM	16kX1 35n
IC234	3330104994	CMOS-RAM	16kX1 35n
IC235	3330104994	CMOS-RAM	16kX1 35n
IC236	3330104994	CMOS-RAM	16kX1 35n
IC237	3330104994	CMOS-RAM	16kX1 35n
IC240	3260541009	TTL	SN74LS541
IC241	3260541009	TTL	SN74LS541
IC242	3260541009	TTL	SN74LS541
IC243	3260541009	TTL	SN74LS541
IC244	3290374007	TTL	74F374 PC
IC245	3290374007	TTL	74F374 PC
IC250	3290157009	TTL	74F157 PC
IC251	3290157009	TTL	74F157 PC
IC252	3290157009	TTL	74F157 PC
IC253	3290157009	TTL	74F157 PC
IC254	3260139006	TTL	HD74LS139P
IC255	3260374006	TTL	SN74LS374N
IC256	3290157009	TTL	74F157 PC
IC260	3330104994	CMOS-RAM	16kX1 35n
IC261	3330104994	CMOS-RAM	16kX1 35n
IC262	3330104994	CMOS-RAM	16kX1 35n
IC263	3330104994	CMOS-RAM	16kX1 35n
IC264	3330104994	CMOS-RAM	16kX1 35n
IC265	3330104994	CMOS-RAM	16kX1 35n
IC266	3330104994	CMOS-RAM	16kX1 35n
IC267	3330104994	CMOS-RAM	16kX1 35n
IC270	3330104994	CMOS-RAM	16kX1 35n
IC271	3330104994	CMOS-RAM	16kX1 35n
IC272	3330104994	CMOS-RAM	16kX1 35n
IC273	3330104994	CMOS-RAM	16kX1 35n
IC274	3330104994	CMOS-RAM	16kX1 35n
IC275	3330104994	CMOS-RAM	16kX1 35n
IC276	3330104994	CMOS-RAM	16kX1 35n
IC277	3330104994	CMOS-RAM	16kX1 35n
IC280	3260541009	TTL	SN74LS541
IC281	3260541009	TTL	SN74LS541
IC282	3260541009	TTL	SN74LS541
IC283	3260541009	TTL	SN74LS541
IC284	3290244004	TTL	74F244 PC

No.	LDR PT No.	DESCRIPTION			
(T-3445	CONT'D)				
R53	1000470006	CARBON FILM	47	OHM	5% 1/6W
)	1010100000	CARBON FILM	10	OHM	5% 1/4W
	1220221005	METAL OXIDE	220	OHM	5% 2W
R56	1311500006	METAL FILM	150	OHM	1% 1/4W
R57	1311500006	METAL FILM	150	OHM	1% 1/4W
R61	1000101005	CARBON FILM	100	OHM	5% 1/6W
R63	1462001007	METAL FILM	2K	OHM	1% 1/6W
R65	1461001001	METAL FILM	1K	OHM	1% 1/6W
R67	1464700005	METAL FILM	470	OHM	1% 1/6W
R68	1000330000	CARBON FILM	33	OHM	5% 1/6W
R69	1462400001	METAL FILM	240	OHM	1% 1/6W
R70	1000279006	CARBON FILM	2.7	OHM	5% 1/6W
R71	1461001001	METAL FILM	1K	OHM	1% 1/6W
R72	1461001001	METAL FILM	1K	OHM	1% 1/6W
R73	1462200003	METAL FILM	220	OHM	1% 1/6W
R74	1462200003	METAL FILM	220	OHM	1% 1/6W
R75	1000821009	CARBON FILM	820	OHM	5% 1/6W
R76	1000470006	CARBON FILM	47	OHM	5% 1/6W
R77	1000333006	CARBON FILM	33K	OHM	5% 1/6W
R78	1461800001	METAL FILM	180	OHM	1% 1/6W
R79	1000820007	CARBON FILM	82	OHM	5% 1/6W
R80	1000152002	CARBON FILM	1.5K	OHM	5% 1/6W
R81	1000470006	CARBON FILM	47	OHM	5% 1/6W
R82	1000152002	CARBON FILM	1.5K	OHM	5% 1/6W
R83	1000470006	CARBON FILM	47	OHM	5% 1/6W
R84	1010100000	CARBON FILM	10	OHM	5% 1/4W
R85	1220221005	METAL OXIDE	220	OHM	5% 2W
R86	1311500006	METAL FILM	150	OHM	1% 1/4W
R87	1311500006	METAL FILM	150	OHM	1% 1/4W
)00	1030220004	CARBON FILM	22	OHM	5% 1W
R130	1000103009	CARBON FILM	10K	OHM	5% 1/6W
R150	1000221005	CARBON FILM	220	OHM	5% 1/6W
R160	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R170	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R190	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R191	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R192	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R193	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R220	1000331002	CARBON FILM	330	OHM	5% 1/6W
R222	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R223	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R224	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R225	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R228	1000101005	CARBON FILM	100	OHM	5% 1/6W
R229	1000101005	CARBON FILM	100	OHM	5% 1/6W
R230	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R231	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R242	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R243	1000101005	CARBON FILM	100	OHM	5% 1/6W
R244	1000101005	CARBON FILM	100	OHM	5% 1/6W
R245	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R246	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R262	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R263	1000101005	CARBON FILM	100	OHM	5% 1/6W
R264	1000101005	CARBON FILM	100	OHM	5% 1/6W
R265	1000102007	CARBON FILM	1K	OHM	5% 1/6W
R266	1000102007	CARBON FILM	1K	OHM	5% 1/6W

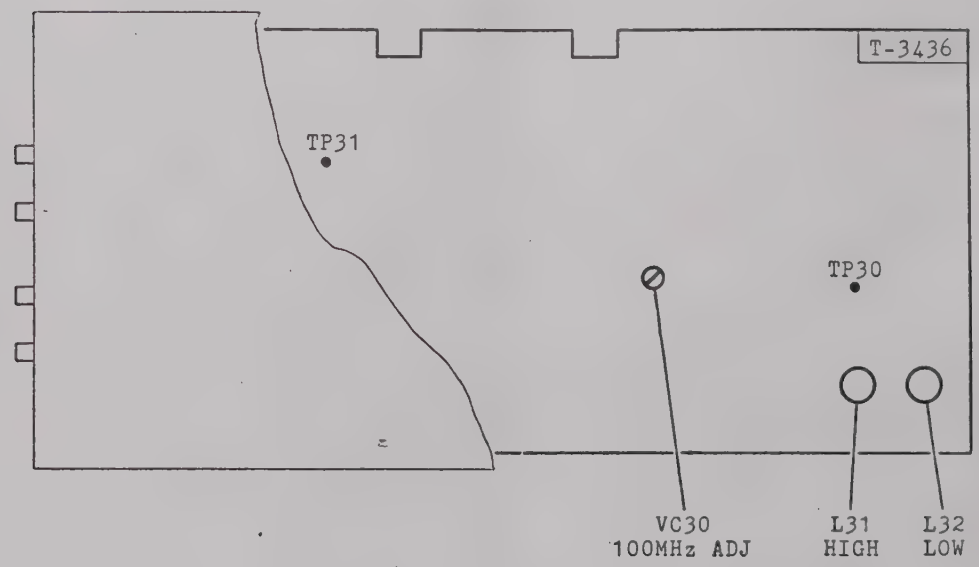
No.	LDR PT No.	DESCRIPTION			
(T-3445	CONT'D)				
R267	1000102007	CARBON FILM	1K OHM	5%	1/6W
R270	1000102007	CARBON FILM	1K OHM	5%	1/6W
R273	1000101005	CARBON FILM	100 OHM	5%	1/6W
R274	1000101005	CARBON FILM	100 OHM	5%	1/6W
R275	1000102007	CARBON FILM	1K OHM	5%	1/6W
R278	1000101005	CARBON FILM	100 OHM	5%	1/6W
R279	1000101005	CARBON FILM	100 OHM	5%	1/6W
R280	1000102007	CARBON FILM	1K OHM	5%	1/6W
R283	1000101005	CARBON FILM	100 OHM	5%	1/6W
R284	1000101005	CARBON FILM	100 OHM	5%	1/6W
R285	1000102007	CARBON FILM	1K OHM	5%	1/6W
R288	1000101005	CARBON FILM	100 OHM	5%	1/6W
R289	1000101005	CARBON FILM	100 OHM	5%	1/6W
R300	1000102007	CARBON FILM	1K OHM	5%	1/6W
R320	1000102007	CARBON FILM	1K OHM	5%	1/6W
R321	1000102007	CARBON FILM	1K OHM	5%	1/6W
R360	1000102007	CARBON FILM	1K OHM	5%	1/6W
R380	1000102007	CARBON FILM	1K OHM	5%	1/6W
R381	1000102007	CARBON FILM	1K OHM	5%	1/6W
R382	1000102007	CARBON FILM	1K OHM	5%	1/6W
R383	1000102007	CARBON FILM	1K OHM	5%	1/6W
R384	1000102007	CARBON FILM	1K OHM	5%	1/6W
R385	1000102007	CARBON FILM	1K OHM	5%	1/6W
R386	1010331009	CARBON FILM	330 OHM	5%	1/4W
R387	1010100000	CARBON FILM	10 OHM	5%	1/4W
R388	1010331009	CARBON FILM	330 OHM	5%	1/4W
R389	1010100000	CARBON FILM	10 OHM	5%	1/4W
R390	1010331009	CARBON FILM	330 OHM	5%	1/4W
R391	1010100000	CARBON FILM	10 OHM	5%	1/4W
R392	1010331009	CARBON FILM	330 OHM	5%	1/4W
R393	1010100000	CARBON FILM	10 OHM	5%	1/4W
R394	1010331009	CARBON FILM	330 OHM	5%	1/4W
R395	1010100000	CARBON FILM	10 OHM	5%	1/4W
R396	1010331009	CARBON FILM	330 OHM	5%	1/4W
R397	1010100000	CARBON FILM	10 OHM	5%	1/4W
R398	1010331009	CARBON FILM	330 OHM	5%	1/4W
R399	1010100000	CARBON FILM	10 OHM	5%	1/4W
R400	1010331009	CARBON FILM	330 OHM	5%	1/4W
R401	1010100000	CARBON FILM	10 OHM	5%	1/4W
R402	1010331009	CARBON FILM	330 OHM	5%	1/4W
R403	1010100000	CARBON FILM	10 OHM	5%	1/4W
R404	1010331009	CARBON FILM	330 OHM	5%	1/4W
R405	1010100000	CARBON FILM	10 OHM	5%	1/4W
R406	1010331009	CARBON FILM	330 OHM	5%	1/4W
R407	1010470003	CARBON FILM	47 OHM	5%	1/4W
R408	1010100000	CARBON FILM	10 OHM	5%	1/4W
R409	1010331009	CARBON FILM	330 OHM	5%	1/4W
R410	1010470003	CARBON FILM	47 OHM	5%	1/4W
R411	1010100000	CARBON FILM	10 OHM	5%	1/4W
RA100	1515103116	RESISTOR ARRAY	10K OHMX8	5%	1/8W
RA130	1515103116	RESISTOR ARRAY	10K OHMX8	5%	1/8W
RA131	1515103116	RESISTOR ARRAY	10K OHMX8	5%	1/8W
RA132	1515103116	RESISTOR ARRAY	10K OHMX8	5%	1/8W
RA133	1515103116	RESISTOR ARRAY	10K OHMX8	5%	1/8W
RA134	1515103116	RESISTOR ARRAY	10K OHMX8	5%	1/8W
RA135	1515103116	RESISTOR ARRAY	10K OHMX8	5%	1/8W
RA276	1511331115	RESISTOR ARRAY	300 OHMX5	5%	1/8W

No.	LDR PT No.	DESCRIPTION			
(T-3445	CONT'D)				
RA277	1511331115	RESISTOR ARRAY	300 OHMX5	5%	1/8W
RA280	1511151113	RESISTOR ARRAY	150 OHMX5	5%	1/8W
RA281	1511151113	RESISTOR ARRAY	150 OHMX5	5%	1/8W
RA282	1511151113	RESISTOR ARRAY	150 OHMX5	5%	1/8W
RA283	1511151113	RESISTOR ARRAY	150 OHMX5	5%	1/8W
RA350	1511103112	RESISTOR ARRAY	10K OHMX5	5%	1/8W
RA351	1511103112	RESISTOR ARRAY	10K OHMX5	5%	1/8W
-VARIABLE RESISTORS-					
VR1	1711005026	METAL GLAZE	1K OHM	20%	1/3W
VR3	1711005008	METAL GLAZE	300 OHM	20%	1/3W
VR4	1711004060	METAL GLAZE	3K OHM	20%	1/3W
VR31	1711005026	METAL GLAZE	1K OHM	20%	1/3W
VR33	1711005008	METAL GLAZE	300 OHM	20%	1/3W
VR34	1711004060	METAL GLAZE	3K OHM	20%	1/3W
VR61	1711005026	METAL GLAZE	1K OHM	20%	1/3W
VR63	1711005008	METAL GLAZE	300 OHM	20%	1/3W
VR64	1711004060	METAL GLAZE	3K OHM	20%	1/3W
VR380	1711005026	METAL GLAZE	1K OHM	20%	1/3W
VR381	1711005026	METAL GLAZE	1K OHM	20%	1/3W
-CAPACITORS-					
C1	2220330045	ELECTROLYTIC	33uF	20%	10V
C2	2120470016	MICA	47pF	10%	500V
C3	2240220042	ELECTROLYTIC	22uF	20%	25V
C4	2240220042	ELECTROLYTIC	22uF	20%	25V
C5	2090016006	CERAMIC	0.1uF		50V
C6	2090016006	CERAMIC	0.1uF		50V
C7	2090016006	CERAMIC	0.1uF		50V
C31	2220330045	ELECTROLYTIC	33uF	20%	10V
C32	2120470016	MICA	47pF	10%	500V
C33	2240220042	ELECTROLYTIC	22uF	20%	25V
C34	2240220042	ELECTROLYTIC	22uF	20%	25V
C35	2090016006	CERAMIC	0.1uF		50V
C36	2090016006	CERAMIC	0.1uF		50V
C37	2090016006	CERAMIC	0.1uF		50V
C61	2220330045	ELECTROLYTIC	33uF	20%	10V
C62	2120470016	MICA	47pF	10%	500V
C63	2240220042	ELECTROLYTIC	22uF	20%	25V
C64	2240220042	ELECTROLYTIC	22uF	20%	25V
C65	2090016006	CERAMIC	0.1uF		50V
C66	2090016006	CERAMIC	0.1uF		50V
C67	2090016006	CERAMIC	0.1uF		50V
C100	2090016006	CERAMIC	0.1uF		50V
C101	2090016006	CERAMIC	0.1uF		50V
C102	2090016006	CERAMIC	0.1uF		50V
C103	2090016006	CERAMIC	0.1uF		50V
C104	2090016006	CERAMIC	0.1uF		50V
C105	2220331047	ELECTROLYTIC	330uF	20%	10V
C106	2220331047	ELECTROLYTIC	330uF	20%	10V
C107	2240101044	ELECTROLYTIC	100uF	20%	25V
C108	2240101044	ELECTROLYTIC	100uF	20%	25V
C109	2090016006	CERAMIC	0.1uF		50V
C110	2240101044	ELECTROLYTIC	100uF	20%	25V
C111	2090016006	CERAMIC	0.1uF		50V
C112	2090016006	CERAMIC	0.1uF		50V
C113	2230470048	ELECTROLYTIC	47uF	20%	16V

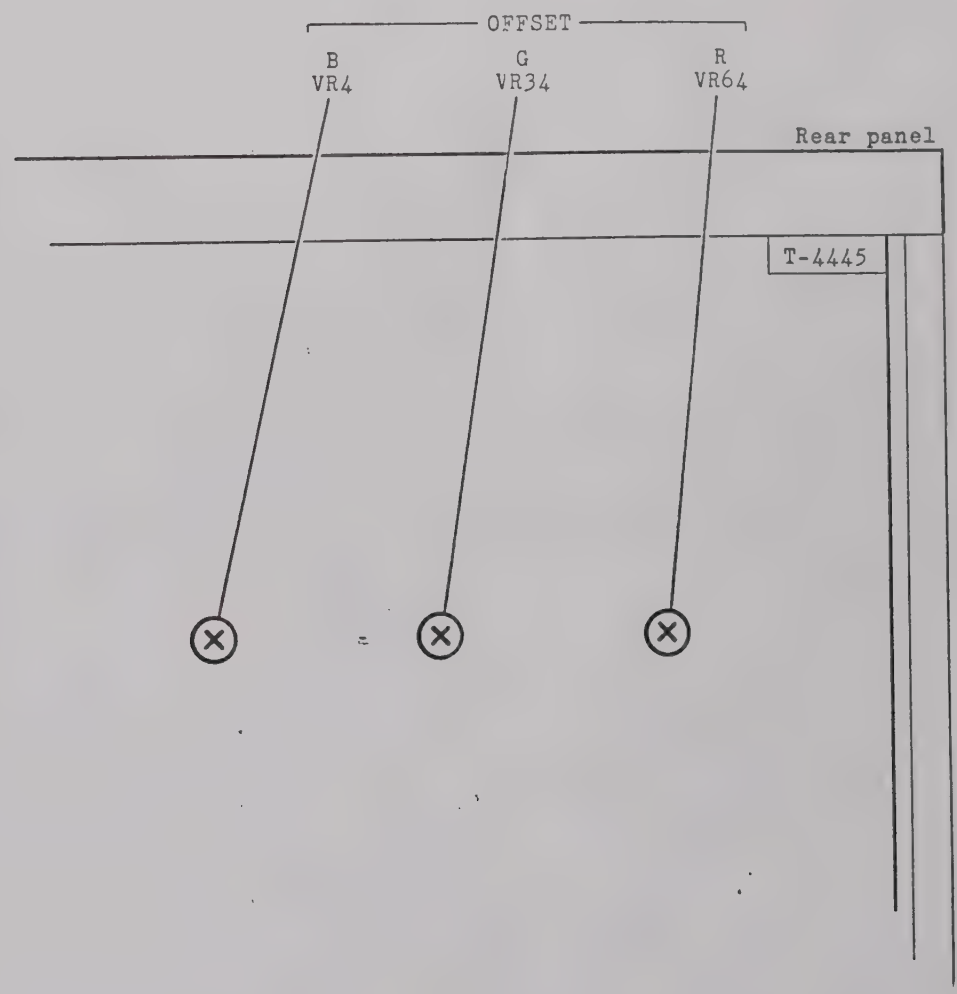
No.	LDR PT No.	DESCRIPTION			
(T-3445	CONT'D)				
C114	2240101044	ELECTROLYTIC	100uF	20%	25V
C115	2090016006	CERAMIC	0.1uF		50V
C116	2090016006	CERAMIC	0.1uF		50V
C117	2230470048	ELECTROLYTIC	47uF	20%	16V
C120	2090016006	CERAMIC	0.1uF		50V
C121	2090016006	CERAMIC	0.1uF		50V
C122	2090016006	CERAMIC	0.1uF		50V
C123	2090016006	CERAMIC	0.1uF		50V
C124	2090016006	CERAMIC	0.1uF		50V
C150	2090016006	CERAMIC	0.1uF		50V
C151	2090016006	CERAMIC	0.1uF		50V
C152	2090016006	CERAMIC	0.1uF		50V
C153	2090016006	CERAMIC	0.1uF		50V
C154	2090016006	CERAMIC	0.1uF		50V
C155	2090016006	CERAMIC	0.1uF		50V
C156	2110101009	MICA	100pF	10%	50V
C160	2090016006	CERAMIC	0.1uF		50V
C161	2090016006	CERAMIC	0.1uF		50V
C162	2090016006	CERAMIC	0.1uF		50V
C163	2090016006	CERAMIC	0.1uF		50V
C164	2090016006	CERAMIC	0.1uF		50V
C165	2090016006	CERAMIC	0.1uF		50V
C166	2090016006	CERAMIC	0.1uF		50V
C167	2090016006	CERAMIC	0.1uF		50V
C168	2090016006	CERAMIC	0.1uF		50V
C169	2090016006	CERAMIC	0.1uF		50V
C170	2090016006	CERAMIC	0.1uF		50V
C171	2090016006	CERAMIC	0.1uF		50V
C172	2090016006	CERAMIC	0.1uF		50V
C173	2090016006	CERAMIC	0.1uF		50V
C174	2090016006	CERAMIC	0.1uF		50V
C175	2090016006	CERAMIC	0.1uF		50V
C176	2090016006	CERAMIC	0.1uF		50V
C180	2090016006	CERAMIC	0.1uF		50V
C181	2090016006	CERAMIC	0.1uF		50V
C182	2090016006	CERAMIC	0.1uF		50V
C183	2090016006	CERAMIC	0.1uF		50V
C190	2090016006	CERAMIC	0.1uF		50V
C191	2090016006	CERAMIC	0.1uF		50V
C192	2090016006	CERAMIC	0.1uF		50V
C193	2090016006	CERAMIC	0.1uF		50V
C194	2090016006	CERAMIC	0.1uF		50V
C195	2090016006	CERAMIC	0.1uF		50V
C196	2090016006	CERAMIC	0.1uF		50V
C197	2090016006	CERAMIC	0.1uF		50V
C198	2090016006	CERAMIC	0.1uF		50V
C200	2090016006	CERAMIC	0.1uF		50V
C201	2090016006	CERAMIC	0.1uF		50V
C202	2090016006	CERAMIC	0.1uF		50V
C203	2090016006	CERAMIC	0.1uF		50V
C204	2090016006	CERAMIC	0.1uF		50V
C205	2090016006	CERAMIC	0.1uF		50V
C210	2090016006	CERAMIC	0.1uF		50V
C211	2090016006	CERAMIC	0.1uF		50V
C212	2090016006	CERAMIC	0.1uF		50V
C213	2090016006	CERAMIC	0.1uF		50V
C214	2090016006	CERAMIC	0.1uF		50V



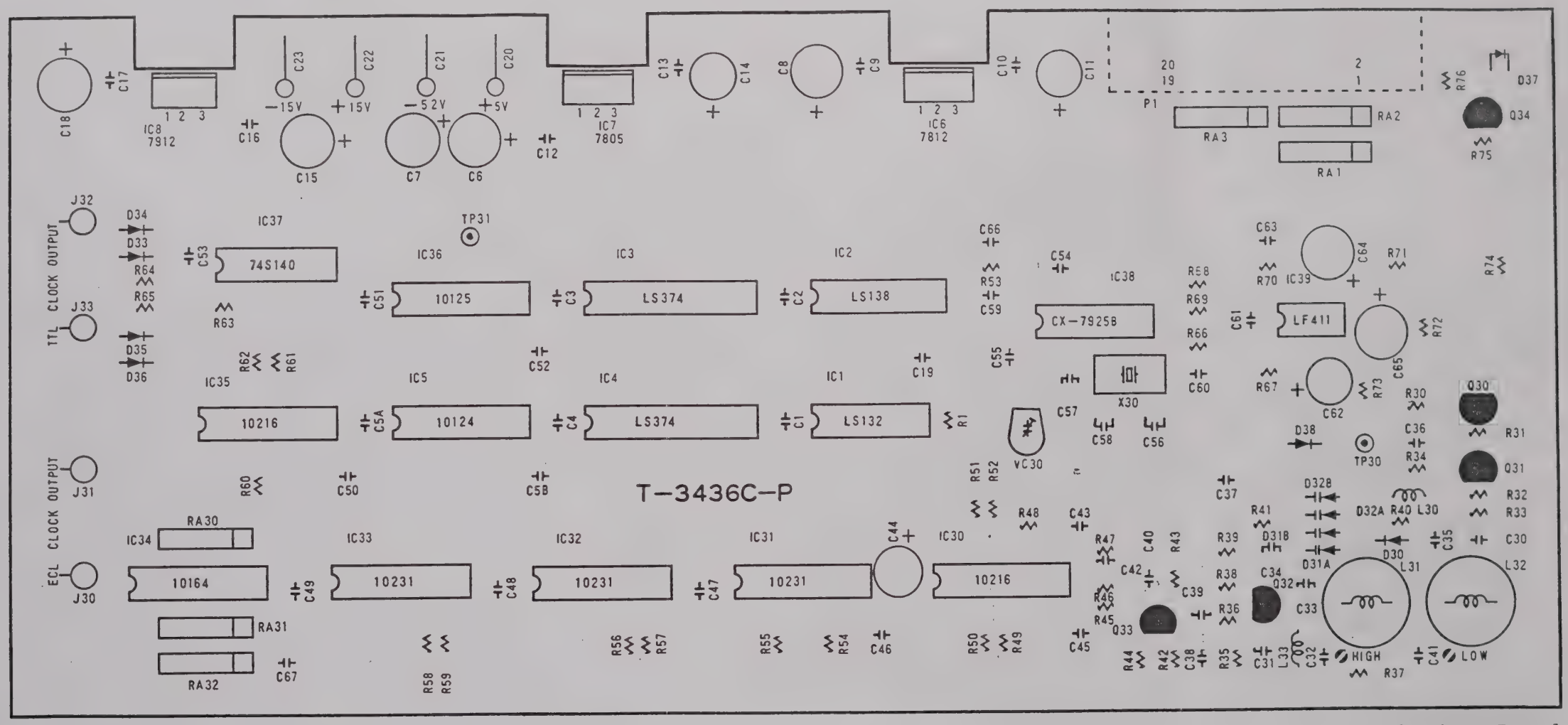
Power Supply
(Bottom view)



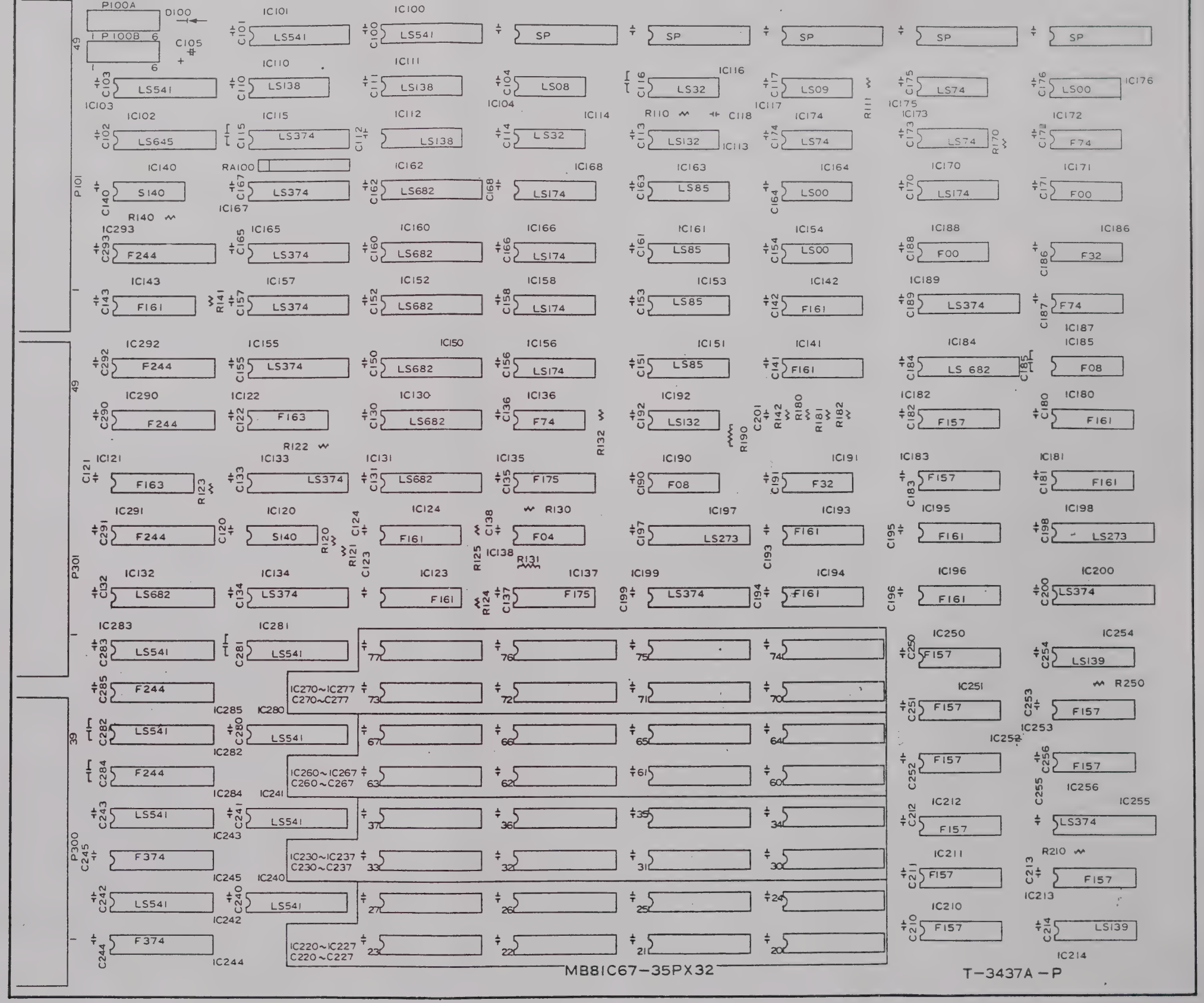
Synthesizer
T-3436



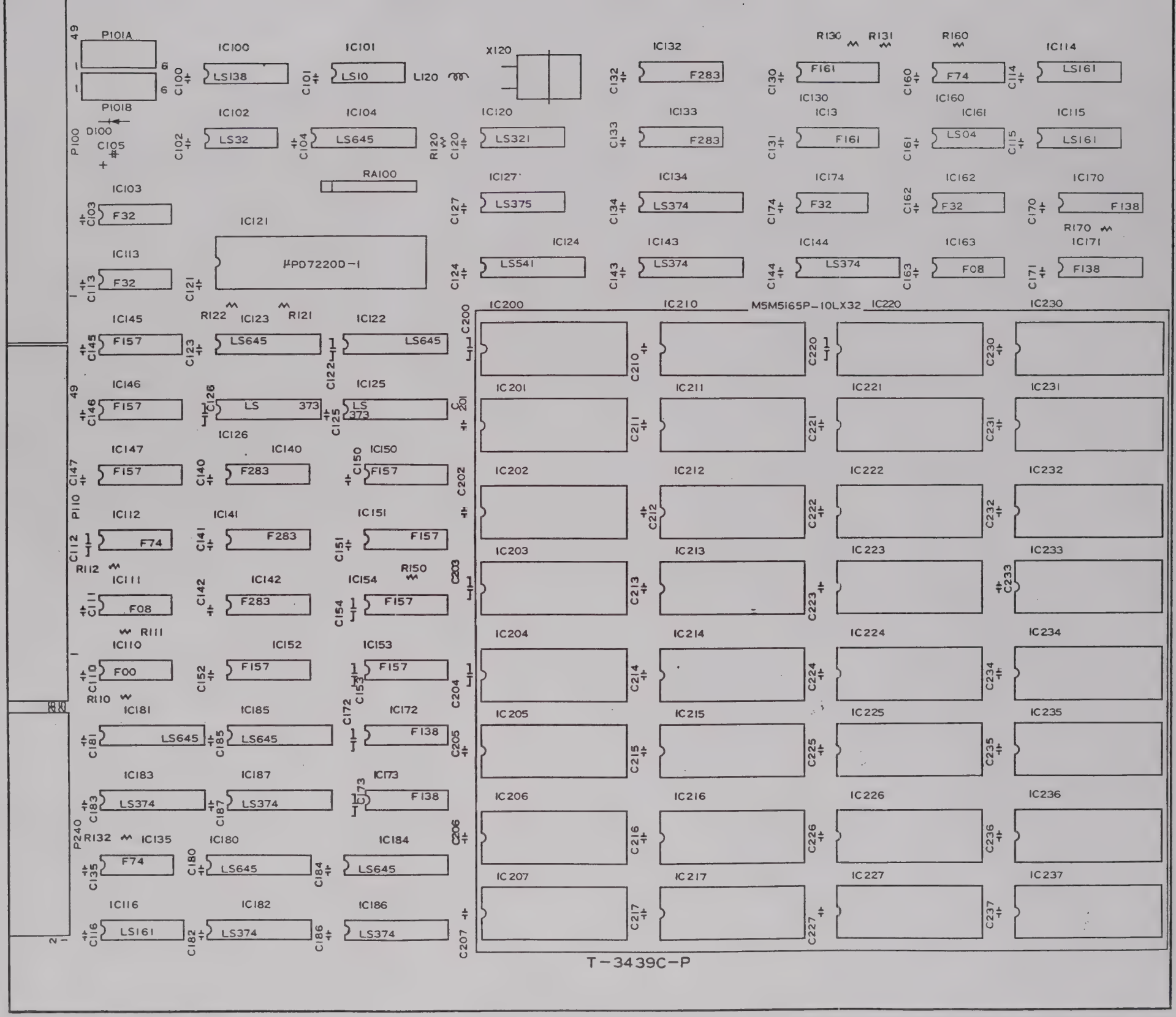
Video Interface
T-3445
(Top view)



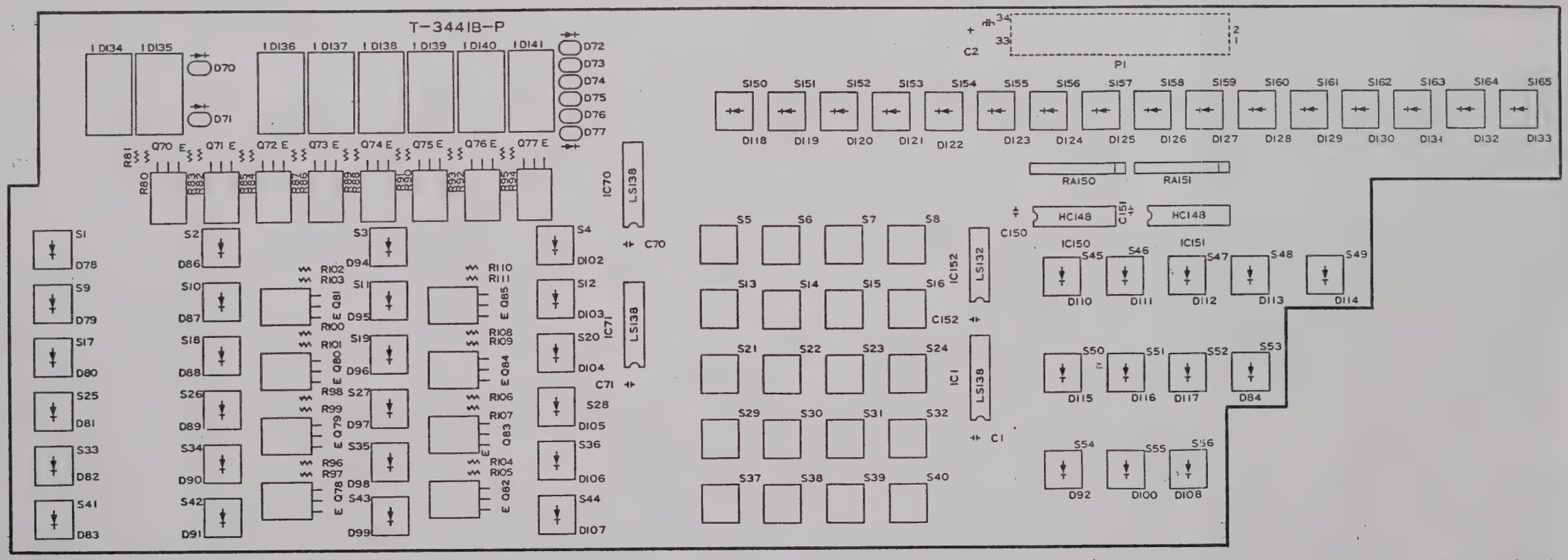
Synthesizer Board
T-3436



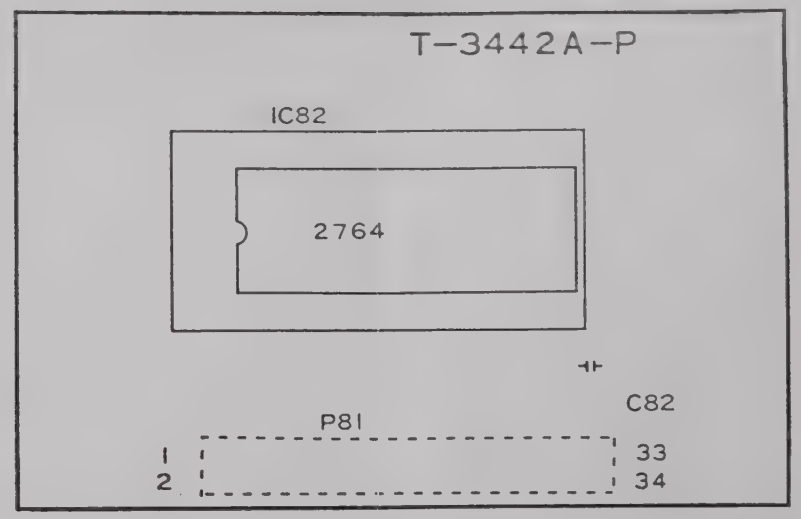
CRTC Board
T-3437



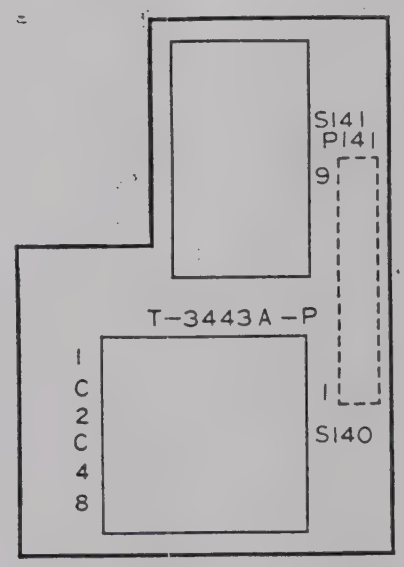
Graphic Board
T-3439



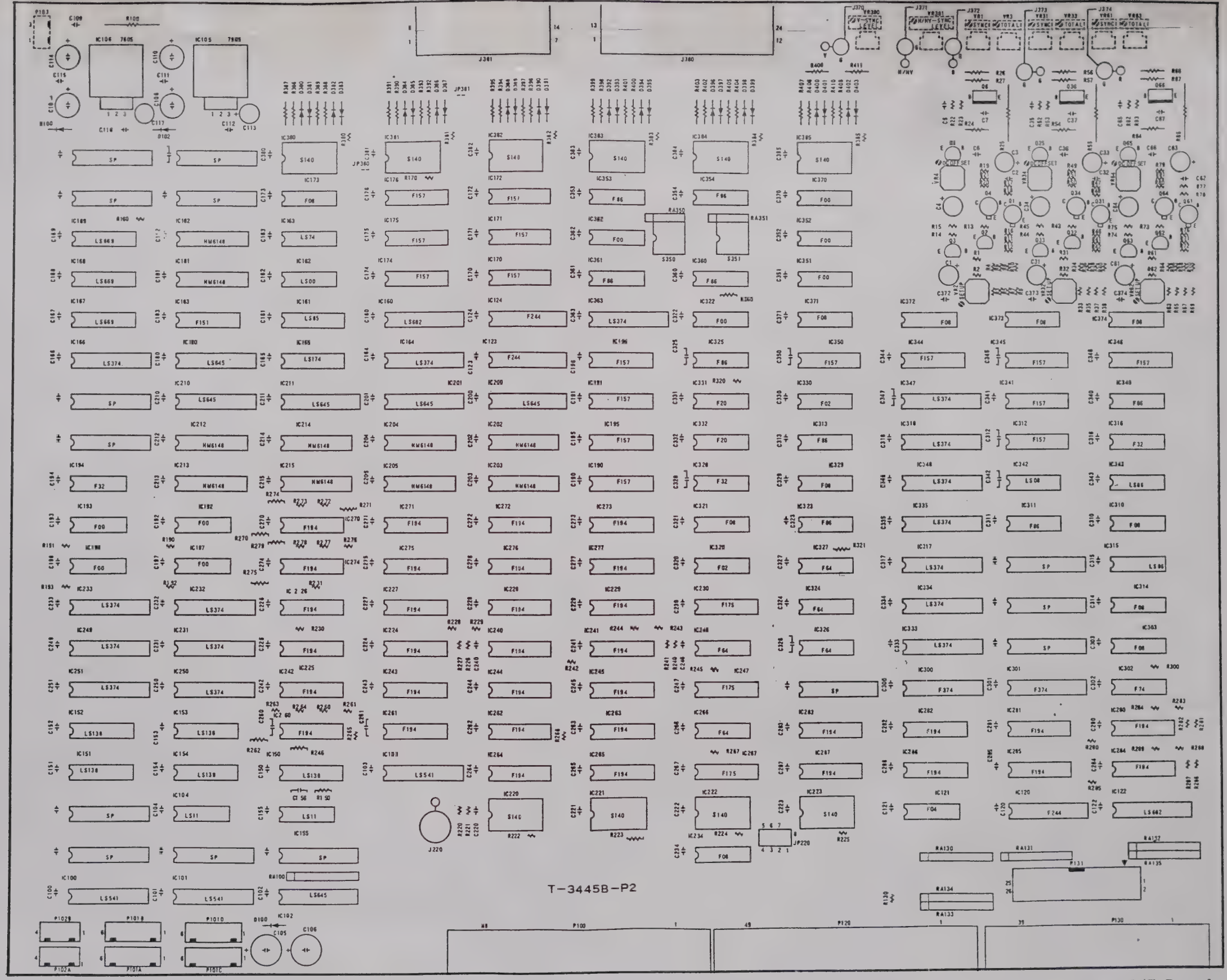
Panel-1 Board(Control/Display)
T-3441



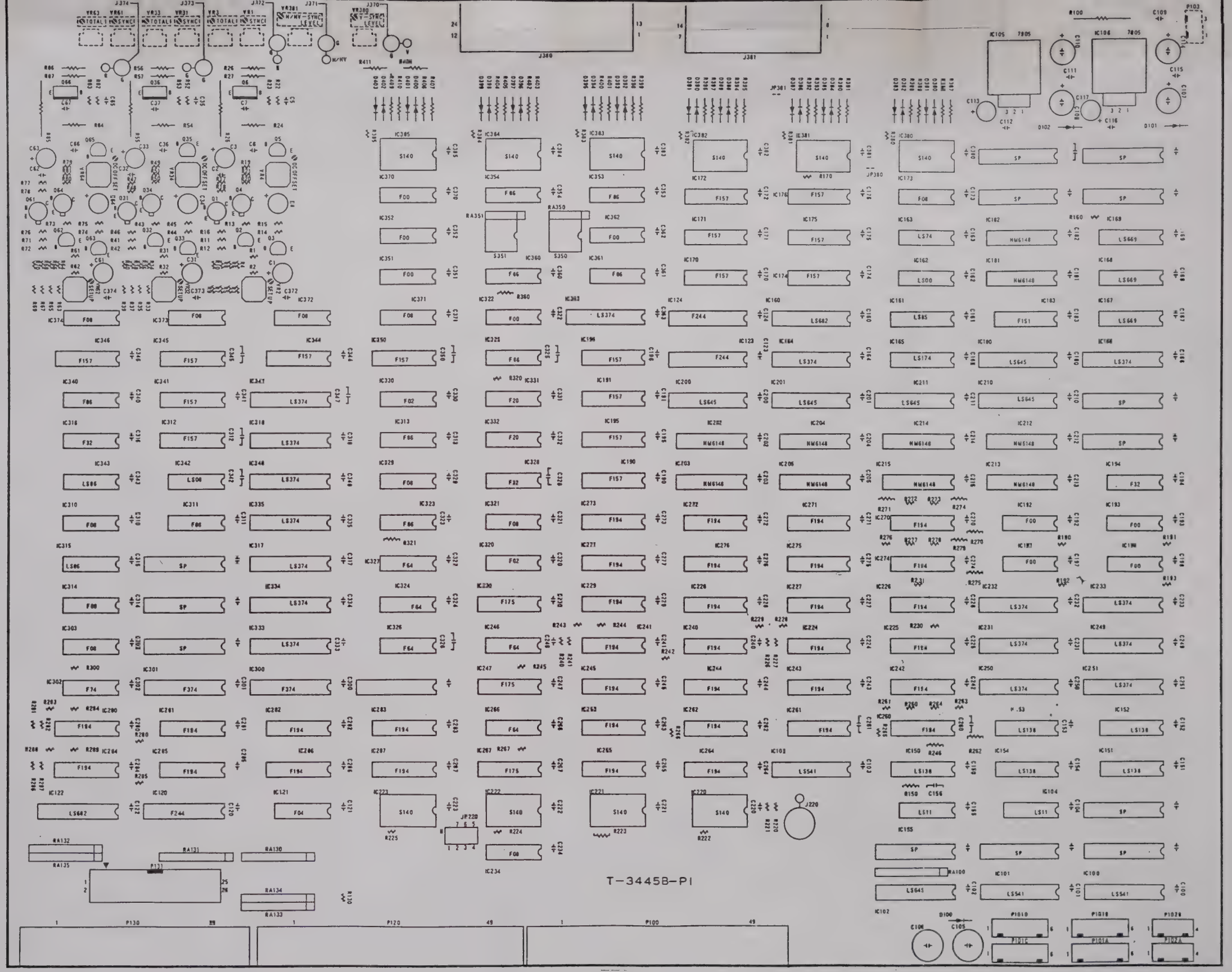
Panel-2 Board(ROM Unit)
T-3442



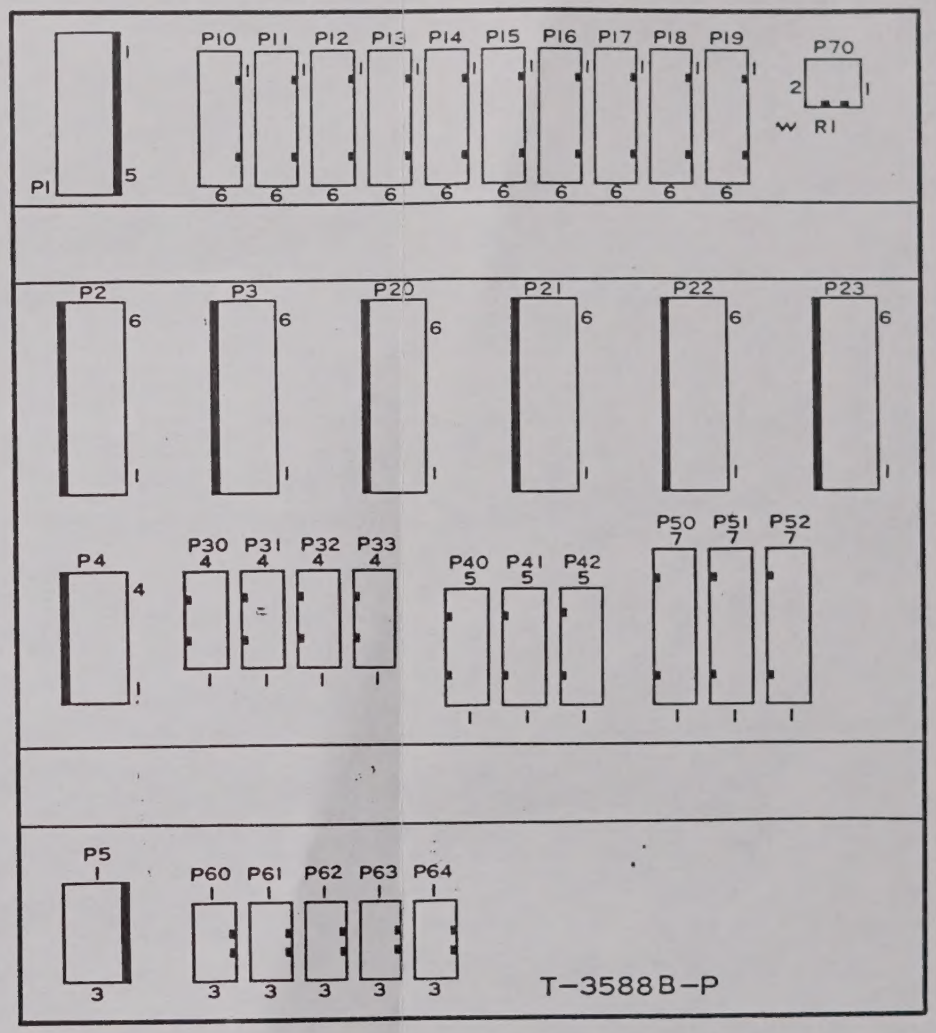
Panel-3 Board(Luminance)
T-3443



Video I/F Board
(Component side)
T-3445



Video I/F Board
(Soldering side)
T-3445



Power Distributor Board
T-3588

7. CABINET REMOVAL

- Take four screws, holding cord winder, to remove the Top and Bottom covers.